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**Biochem-Fall 2011**

**Exam Two Practice Test**

***Note: I wrote up these questions using our lecture slides from last year. While they are very similar—and often identical—to the ones used this year, some may vary slightly, so a couple of the questions on here might not have been covered in your lectures. If you find any errors, please let me know.***

1. Which of these contains an isoprene component?
2. Sphingolipid
3. Sterol
4. Acylglycerol
5. Eicosanoid
6. Phospholipid
7. Which of these is **not** true about arachidonate?
8. It is a polyunsaturated fatty acid.
9. Its structure consists of four double bonds.
10. Its molecular formula is C18H24O2
11. It is expected to have a lower melting temperature than stearate.
12. Its *cis* configuration has a lower melting point than does its *trans* configuration.
13. The enzyme that catalyzes the acylation of Coenzyme A is a
14. Thiokinase
15. Thiolase
16. Dehydrogenase
17. Hydratase
18. None of the above
19. How many ATP are produced when one molecule of Myristate is broken down (Recall that it must be activated before being broken down)?
20. 94
21. 92
22. 120
23. 106
24. 122
25. Choose the correct statement.
26. Ground substance contains more hyaluronic acid than chondroitin-4-sulfate.
27. The territorial matrix (aka capsular matrix) is thought to protect chondrocytes from mechanical stresses.
28. A herniated disc results from an extrusion of the annulus fibrosis, which consists of fibrocartilage.
29. Rheumatoid arthritis affects only synovial joints, not fibrous or cartilaginous joints.
30. Articular cartilage is a specialized form of fibrocartilage covering the ends of bones in synovial joints.
31. Which statement about joints is **false**?
    1. Functional joints are *always* functionally classified as synarthroses.
    2. Synovial joints are *always* functionally classified as diarthroses.
    3. Syndesmoses *always* unite bones via dense fibrous tissue.
    4. Cartilagenous joints *never* contain a cavity.
    5. Gomphoses are *never* functionally classified as amphiarthroses.
32. Choose the correct statement.
    1. A 100-year-old human being will have gone through more than four complete skeletons in their lifetime.
    2. Osteoid is a layer of heavily mineralized matrix that surrounds an osteocyte.
    3. Osteoblasts are located in resorption bays on the surface of bone.
    4. Approximately 60-65% of total bone weight is composed of the organic compound.
    5. Immature bone has no collagen fibers.
33. Choose the correct statement.
    1. The Cellular Nucleation Theory of mineral deposition implicates matrix vesicles, which contain alkaline phosphatase, an enzyme which inhibits calcification.
    2. Primary mineralization is responsible for 30% of the total mineralization of bone osteoid in the matrix.
    3. In the system of classifying bones by shape, tarsals are examples of irregular bones.
    4. The osteogenic layer of the periosteum consists of osteoblasts differentiating and laying down new bone, and example of appositional growth.
    5. Haversian remodeling occurs immediately before woven bone is laid down.
34. Consider the process of secondary bone formation. The first visible sign is the formation of \_\_\_\_\_\_\_\_, which is immediately followed by the formation of \_\_\_\_\_\_\_\_.
    1. Granulocyte-macrophage progenitor cells; osteoclasts
    2. Osteoclasts; the Reversal Zone
    3. Osteoid; the Resorption Cone
    4. The Resorption Cone; the Reversal Zone
    5. Osteoclasts; the Resorption Cone
35. Which statement is true about both Parathyroid Hormone and Calcitonin?
    1. The net effect of both hormones is to decrease calcium levels in the blood.
    2. Both secrete Osteoclastic Stimulating Factor.
    3. The receptors for both hormones are osteoclasts.
    4. Both decrease osteoblastic activity.
    5. None of the above
36. Which statement is true about the connective tissue involved in the organization of muscle?
    1. The epimysium is an example of dense regular connective tissue.
    2. Individual muscle cells are surrounded by type I and type III collagen.
    3. The epimysium is an example of loose connective tissue.
    4. Myocytes are typically surrounded by dense irregular connective tissue.
    5. Muscle fibers are surrounded by type I and type IV collagen.
37. Consider the following statements about muscle.

I.Control of smooth muscle contraction is involuntary, slow, and forceful.

II. Gap junctions are present in both smooth and cardiac muscle.

III. Skeletal muscle cells can regenerate via mitotic division.

IV. Skeletal muscle cells contain multiple, centrally located nuclei.

V. Smooth muscle cells are fusiform in shape.

Which statement(s) is/are true?

1. I, III, and V
2. I, II, IV, and V
3. I and IV
4. I, II, and V
5. I, II, III, IV, and V
6. Choose the correct statement regarding red, white, and intermediate smooth muscle fibers.
   1. Red fibers are primarily oxidative, white are primarily glycolytic, and intermediate are both.
   2. Red fibers are higher in myoglobin than white fibers.
   3. White fibers contract quicker than red fibers.
   4. All of the above.
   5. None of the above.
7. Which band(s)/line(s) of the sarcomere contain thin filaments?
   1. A-Band and I-band only
   2. A-Band, I-band, and Z-line
   3. A-Band, I-band, and H-Band
   4. A-Band, H-Band, and M-Line
   5. I-Band, H-Band, and M-Line
8. Choose the correct statement about the proteins associated with thin filaments.
   1. Troponin caps the minus (-) end of actin filaments.
   2. G-actin is formed from two strands of F-actin arranged in a double helix.
   3. Tropomodulin is responsible for calcium regulation of contraction.
   4. Nebulin is anchored at the Z-line.
   5. Troponin and tropomodulin are associated with thin filaments, but tropomyosin is not.
9. Which of these increases in size during contraction of the muscle fiber?

I.I-Band

II.A-Band

III.H-Band

1. I, II, and III
2. I and III only
3. II and III only
4. II only
5. None of these
6. How many of the NADPH molecules necessary for the synthesis of palmitate come from the pentose phosphate pathway?
   1. 6
   2. 8
   3. 10
   4. 12
   5. 14
7. Which of these fatty acids can be synthesized by mammalian cells, and therefore does not need to be consumed in the diet? Hint: Adrenate is denoted by 22:4 (7,10,13,16).
   1. Linoleate
   2. Linolenate
   3. Arachidonate
   4. Stearate
   5. Adrenate
8. Choose the correct statement.
   1. Bone tissue is an example of endochondral growth.
   2. Irregular bones are formed via intramembranous ossification.
   3. During intramembranous ossification, bone islands are formed immediately following the mineralization of osteoid.
   4. The least developed bone is in the middle of the ossification center.
   5. Endochondral ossification describes the replacing of fibrocartilage by bone.
9. Choose the correct statement.
   1. Long bones increase in diameter by intramembranous ossification, but in length by endochondral ossification.
   2. Irregular bones always have a single ossification center, which is in the center of the diaphysis.
   3. The epiphyseal plate increases the length of long bone by appositional growth.
   4. The zone of the epiphyseal plate where the cells begin to secrete alkaline phosphatase is known as the zone of proliferation.
   5. In late adolescence, the rate of proliferation of cartilage slows down, while the rate of cartilage erosion speeds up.
10. Acromegaly is caused by an excess of
    1. Growth hormone in a growing child
    2. Somatotropin in adults
    3. Vitamin A in a growing child
    4. Vitamin A in adults
    5. Vitamin D in adults
11. Choose the correct statement about the repair of bones following simple fractures.
    1. Direct trauma is caused by stoppage of blood flow through broken osteons.
    2. During early repair, basophils and macrophages clean out the blood clot by phagocytosis.
    3. Both intermambranous *and* endochondral ossification occur during fracture repair.
    4. “Reduction” describes the breaking of a bone into two pieces.
    5. The stage of fracture repair in which osteoprogenitor cells differentiate into osteoblasts and begin laying down bone osteoid directly on the end of the fractured bone is known as “union.”
12. Lack of acetylcholinesterase in the synaptic cleft would result in:
    1. Decreased acetylcholine production by the motor neuron.
    2. Relaxation of the muscle fiber.
    3. Excessive, continuous stimulation of the muscle fiber.
    4. The inability of the motor neuron to stimulate the muscle fiber.
    5. None of the above.
13. Muscle spindles:
    1. Have a shape similar to that of smooth muscle fibers.
    2. Are sensory endings responsible for monitoring muscle tension.
    3. Are innervated by annulospiral, or secondary, endings.
    4. Convey length information to the central nervous system via motor neurons.
    5. Are composed of two types of intrafusal fibers, known as annulospiral and flower spray fibers.
14. Consider the following sugars: Glucose, fructose, xyulose, galactose, ribose, mannose.

How many of these sugars are ketoses?

* 1. 1
  2. 2
  3. 3
  4. 4
  5. 5

1. Vimentin is:
   1. A thin filament present in the cytoplasm of smooth muscle cells.
   2. An intermediate filament present in the cytoplasm of smooth muscle cells.
   3. An thick filament present on the cytoplasm of smooth muscle cells.
   4. Present in smooth and cardiac muscle cells, but not in smooth muscle cells.
   5. Is structurally a tetramer.
2. Visceral smooth muscle:
   1. Has many neuromuscular junctions with different functions.
   2. Has nerve impulses that initiate contraction.
   3. Is arranged such that each muscle cell is individually innervated.
   4. Utilizes rapid and precise contractions.
   5. Involves impulses transmitted by gap junctions.
3. Which of these enzymes catalyzes a reversible step of glycolysis?
   1. Hexokinase
   2. Phosphofructokinase
   3. Phosphohexose isomerase
   4. Pyruvate kinase
   5. None of these
4. How many net moles of NADH+H+ are produced during glycolysis in the presence of oxygen?
   1. 0
   2. 2
   3. 4
   4. 10
   5. 32
5. Cranial nerve ganglia are an example of
   1. Unipolar neurons
   2. Bipolar neurons
   3. Pseudounipolar neurons
   4. Multipolar neurons
   5. Polypolar neurons
6. Which of the following organelles is responsible for the appearance of Nissl bodies in the cytoplasm of the cell bodies of neurons?
   1. Smooth ER
   2. Rough ER
   3. Golgi apparatus
   4. Mitochondria
   5. Peroxisome
7. Glial cells:
   1. Make up approximately 70% of the brain’s volume.
   2. Outnumber neurons by a 2:1 ratio.
   3. Include fibrous astrocytes, which associated with gray matter.
   4. Include protoplasmic astrocytes, which are associated with unmyelinated regions.
   5. Both C and D are correct.
8. Which statement is true about sensory receptors?
   1. Meissner’s corpuscles are larger than Pacinian corpuscles.
   2. Meissner’s corpuscles mediate deep touch, while Pacinian corpuscles mediate light touch.
   3. Pacinian corpuscles mediate pain and temperature.
   4. Pacinian corpuscles consist of many layers of alternating fibroblast and fluid-filled spaces.
   5. Central axons of pacinian corpuscles terminate in the ventral horn of the spinal cord.
9. Type IIa muscle fibers have:
   1. Higher ATPase activity than type IIb fibers.
   2. Higher fatigue resistance than type I fibers.
   3. Higher efficiency than type I fibers.
   4. Higher amounts of mitochondria than type I fibers.
   5. Higher oxidative capacity than type IIb fibers.
10. Which of these is an example of an extensor at the ankle joint?
    1. Anterior tibialis
    2. Soleus
    3. Gastrocnemius
    4. Iliopsoas
    5. None of the above
11. Which of these is a cause of age-associated muscle atrophy?
    1. Grouping of type I fibers and loss of type II fibers
    2. Grouping of type II fibers and loss of type I fibers
    3. Grouping of both type I and type II fibers
    4. Loss of both type I and type II fibers
    5. Decreased oxidative stress in muscles
12. Which of the following statements about the pentose phosphate pathway is correct?
    1. It generates 36 mol of ATP per mol of glucose consumed.
    2. It generates 6 mol of CO2 for each mol of glucose consumed.
    3. It is a reductive pathway that consumed NADH.
    4. It is present in plants, but not in animals.
    5. It provides the precursors for the synthesis of nucleotides.
13. The oxidation of 3 mol of glucose by the PPP may result in the production of:
    1. 2 mol of pentose, 4 mol of NADPH, and 8 mol of CO2.
    2. 3 mol of pentose, 4 mol of NADPH, and 3 mol of CO2.
    3. 3 mol of pentose, 6 mol of NADPH, and 3 mol of CO2.
    4. 4 mol of pentose, 3 mol of NADPH, and 3 mol of CO2.
    5. 4 mol of pentose, 6 mol of NADPH, and 6 mol of CO2.